Understanding the growth kinetics of Listeria monocytogenes on pressurized cooked meat products depending on its physiological state

Hereu, A.; Dalgaard, Paw; Garriga, M.; Aymerich, T.; Bover-Cid, S.

Published in:
2nd Workshop on Food Safety Technologies and Innovations Applied to Food Safety

Publication date:
2012

Document Version
Publisher's PDF, also known as Version of record

UNDERSTANDING THE GROWTH KINETICS OF *LISTERIA MONOCYTOGENES* ON PRESSURIZED COOKED MEAT PRODUCTS DEPENDING ON ITS PHYSIOLOGICAL STATE

A. Hereu[1], P. Dalgaard[2], M. Garriga[1], T. Aymerich[1], S. Bover-Cid[1]

[1]IRTA. Food Safety Programme. Finca Camps i Armet, E-17121 Monells, Spain. [2]Technical University of Denmark (DTU), National Food Institute, Soltofts Plads, Bygning 221, DK-2800, Kgs. Lyngby, Denmark.

Abstract. The bactericidal effect of high hydrostatic pressure (HHP) on ready-to-eat (RTE) products has been largely studied. However, most available predictive models deal with HHP-inactivation, without considering the recovery of surviving cells during subsequent chilled storage, neither the influence of the physiological state of the pathogen. Therefore, we aimed to model the growth kinetics of *L. monocytogenes* on pressurized RTE sliced cooked meat products (cooked ham and mortadella), depending on the inoculum level and its physiological state, established by using different pre-culture conditions. Slices of both products were inoculated with *L. monocytogenes* CTC1034, at 10^7 and 10^4 cfu/g using two different pre-cultures in the stationary phase: one was adapted to refrigeration at 8ºC and the other was cold shocked at -80 ºC. Inoculated samples were vacuum packaged, pressurized (400 MPa, 5 min, 15ºC) and thereafter stored at 4, 8 and 12 ºC. *L. monocytogenes* was periodically enumerated on ALOA plates. Log-transformed counts were fitted to the Logistic model with delay to estimate the lag phase (λ), maximum specific growth rate (μ_{max}) and maximum population density (N_{max}). The influence of the storage temperature on λ, μ_{max} and N_{max} was assessed by secondary modeling. HHP-inactivation was influenced by product characteristics and the physiological state of the pathogen. Cold shock resulted in a significant baroprotection. Regardless of the inoculum level and the physiological state of *L. monocytogenes*, HHP had no effect on μ_{max}. However a significant λ was observed for the pathogen when previously shocked at -80 ºC. The developed secondary models for μ_{max} and λ, allowed growth of *L. monocytogenes* during the storage of pressurized RTE cooked meat products to be predicted. In conclusion, the relevance of the physiological state of *L. monocytogenes* prior to HHP treatments is an important factor to be taken into account when assessing the effectiveness of HHP as listericidal post-processing treatment.